

November 11, 2016

Meagan E. Ormand
Golder Associates Inc.
2108 W. Laburnum Ave.
Suite 200
Richmond, VA 23227

RE: Project: Bremo Monthly Process
Pace Project No.: 92319091

Dear Meagan Ormand:

Enclosed are the analytical results for sample(s) received by the laboratory on November 09, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kevin Herring for
Nicole Gasiorowski
nicole.gasiorowski@pacelabs.com
Project Manager

Enclosures

cc: Ron DiFrancesco, Golder Associates Inc.
Arielle Green, Golder Associates Inc.
Martha Smith, Golder Associates Inc.
Mike Williams, Golder Associates Inc.



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
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CERTIFICATIONS

Project: Bremo Monthly Process

Pace Project No.: 92319091

Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074

Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
Wyoming Certification: FL NELAC Reciprocity
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

Eden Certification IDs

205 East Meadow Road Suite A, Eden, NC 27288
North Carolina Drinking Water Certification #: 37738

North Carolina Wastewater Certification #: 633
Virginia/VELAP Certification #: 460025

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SAMPLE ANALYTE COUNT

Project: Bremo Monthly Process

Pace Project No.: 92319091

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92319091001	T3-16108-0300-S3	ASTM D4282-02	KCE	1	PASI-E
		EPA 200.7	RVK	8	PASI-O

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Monthly Process

Pace Project No.: 92319091

Method: ASTM D4282-02

Description: Cyanide, Free

Client: Golder_Dominion_Bremo

Date: November 11, 2016

General Information:

1 sample was analyzed for ASTM D4282-02. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Monthly Process

Pace Project No.: 92319091

Method: EPA 200.7

Description: 200.7 MET ICP

Client: Golder_Dominion_Bremo

Date: November 11, 2016

General Information:

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Bremo Monthly Process

Pace Project No.: 92319091

Sample: T3-16108-0300-S3		Lab ID: 92319091001		Collected: 11/08/16 03:00		Received: 11/09/16 14:46		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
Cyanide, Free	Analytical Method: ASTM D4282-02								
Cyanide, Free	ND	mg/L	0.050	1		11/10/16 10:10	57-12-5		
200.7 MET ICP	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Aluminum	ND	ug/L	100	1	11/10/16 12:20	11/10/16 15:42	7429-90-5		
Barium	280	ug/L	10.0	1	11/10/16 12:20	11/10/16 15:42	7440-39-3		
Beryllium	ND	ug/L	1.0	1	11/10/16 12:20	11/10/16 15:42	7440-41-7		
Boron	1690	ug/L	50.0	1	11/10/16 12:20	11/10/16 15:42	7440-42-8		
Cobalt	ND	ug/L	10.0	1	11/10/16 12:20	11/10/16 15:42	7440-48-4		
Iron	ND	ug/L	250	1	11/10/16 12:20	11/10/16 15:42	7439-89-6		
Molybdenum	183	ug/L	10.0	1	11/10/16 12:20	11/10/16 15:42	7439-98-7		
Vanadium	ND	ug/L	10.0	1	11/10/16 12:20	11/10/16 15:42	7440-62-2		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Bremo Monthly Process

Pace Project No.: 92319091

QC Batch: 336463

Analysis Method: ASTM D4282-02

QC Batch Method: ASTM D4282-02

Analysis Description: ASTM D4282 Free Cyanide

Associated Lab Samples: 92319091001

METHOD BLANK: 1865704

Matrix: Water

Associated Lab Samples: 92319091001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cyanide, Free	mg/L	ND	0.050	11/10/16 10:10	

LABORATORY CONTROL SAMPLE: 1865705

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide, Free	mg/L	.1	0.10	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1865706 1865707

Parameter	Units	92319091001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Cyanide, Free	mg/L	ND	.1	.1	0.10	0.10	101	104	90-110	3	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Bremo Monthly Process
Pace Project No.: 92319091

QC Batch:	331456	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 MET
Associated Lab Samples:	92319091001		

METHOD BLANK: 1772478 Matrix: Water
Associated Lab Samples: 92319091001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	100	11/10/16 15:22	
Barium	ug/L	ND	10.0	11/10/16 15:22	
Beryllium	ug/L	ND	1.0	11/10/16 15:22	
Boron	ug/L	ND	50.0	11/10/16 15:22	
Cobalt	ug/L	ND	10.0	11/10/16 15:22	
Iron	ug/L	ND	250	11/10/16 15:22	
Molybdenum	ug/L	ND	10.0	11/10/16 15:22	
Vanadium	ug/L	ND	10.0	11/10/16 15:22	

LABORATORY CONTROL SAMPLE: 1772479

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	2500	2300	92	85-115	
Barium	ug/L	250	234	93	85-115	
Beryllium	ug/L	25	24.5	98	85-115	
Boron	ug/L	2500	2260	91	85-115	
Cobalt	ug/L	250	245	98	85-115	
Iron	ug/L	2500	2410	96	85-115	
Molybdenum	ug/L	250	252	101	85-115	
Vanadium	ug/L	250	248	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1772480 1772481

Parameter	Units	92319083001		MS		MSD		MS		MSD		MS		MSD		% Rec		% Rec		% Rec		% Rec		Limits		RPD		Qual	
		Result	Conc.	Spike Conc.	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.
Aluminum	ug/L	ND	2500	2500	2500	2420	2460	94	95	70-130	2																		
Barium	ug/L	292	250	250	250	515	518	89	90	70-130	1																		
Beryllium	ug/L	ND	25	25	25	24.8	24.8	99	99	70-130	0																		
Boron	ug/L	1750	2500	2500	2500	3980	4010	89	90	70-130	1																		
Cobalt	ug/L	ND	250	250	250	243	246	97	98	70-130	1																		
Iron	ug/L	ND	2500	2500	2500	2470	2500	97	98	70-130	1																		
Molybdenum	ug/L	191	250	250	250	432	436	96	98	70-130	1																		
Vanadium	ug/L	ND	250	250	250	255	259	100	101	70-130	2																		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: Bremo Monthly Process

Pace Project No.: 92319091

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-E Pace Analytical Services - Eden

PASI-O Pace Analytical Services - Ormond Beach

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE


Project: Bremo Monthly Process

Pace Project No.: 92319091

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92319091001	T3-16108-0300-S3	ASTM D4282-02	336463		
92319091001	T3-16108-0300-S3	EPA 200.7	331456	EPA 200.7	331486

REPORT OF LABORATORY ANALYSIS

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	Document Name:	Document Revised: May 24, 2016
	Sample Condition Upon Receipt(SCUR)	Page 1 of 2
	Document No.: F-MEC-CS-009-Rev.03	Issuing Authority: Pace Mechanicsville Quality Office

Sample Condition Upon Receipt

Client Name:

Golden/Bremo

Project:

WO#: 92319091



Courier:
☐ Commercial

☐ Fed Ex ☐ UPS ☐ USPS ☐ Client
☒ Pace ☐ Other:

Custody Seal Present? ☒ Yes ☐ No Seals Intact? ☒ Yes ☐ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other:

Thermometer: ☒ RMD001 ☐ Type of ice: ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Correction Factor: 0.0°C Cooler Temp Corrected (°C): 4.7 Biological Tissue Frozen? ☐ Yes ☐ No ☐ N/A

Temp should be above freezing to 6°C

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

			Comments/Discrepancy:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Short Hold Time Analysis (<72 hr.)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Rush Turn Around Time Requested?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.	
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Samples Field Filtered?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	8.	Note if sediment is visible in the dissolved container
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Includes Date/Time/ID/Analysis Matrix: <u>WW</u>			
All containers needing acid/base preservation have been checked?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.	HNCs pH<2 HCl pH<2 H2SO4 pH<2 NaOH pH>12 NaOH/ZnOAc pH>9
All containers needing preservation are found to be in compliance with EPA recommendation?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
(HNO3, H2SO4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC,LLHg	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Samples checked for dechlorination?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.	
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12.	
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.	
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		
Pace Trip Blank Lot # (if purchased):			

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted:

Date/Time:

Comments/Sample

Discrepancy:

Project Manager SCURF Review:

Date:

Project Manager SRF Review:

Date:

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)



www.paceanals.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A

Required Client Information:

Company: Golder Associates

Address: 2108 W Laburnum Ave, Ste 200

Richmond VA 23227

Email To: Mommand@golder.com

Phone: 804-551-0129 Fax: 804-358-2900

Requested Due Date/TAT: 3-4-08 3-5-Day

Section B

Required Project Information:

Report To: Mommand@golder.com

Copy To: Martha_Smith@golder.com

Ron_Difrancesco@golder.com

Purchase Order No.:

Project Name: Bremo Monthly Process

Project Number: 1520-347-220

Section C

Invoice Information:

Attention: Meagan Ormand

Company Name: Golder Associates

Address: galapdataentry_invoices@golder.com

Pace Quote

Reference:

Pace Project Manager:

Pace Profile #:

Page: 1 of 1

REGULATORY AGENCY

NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐

UST ☐ RCRA ☐ OTHER ☐

Site Location STATE: VA

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives		Analysis Test	Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.
				DATE	TIME			Unpreserved	Y/N		Y	N	
1	TS-16/108-0300-53	WW	G	11/8/16	03:00	3	3	H ₂ SO ₄	X	200.7 - Al, Ba, Be, B, Co	X		92319091
2								HNO ₃	X	200.7 - Fe, Mo, V	X		
3								HCl	X	ASTM4282 - Free Cyanide	X		
4								NaOH					
5								Na ₂ S ₂ O ₃					
6								Methanol					
7								Other					
8													
9													
10													
11													
12													

ADDITIONAL COMMENTS

All analyses to be performed under Golder-Pace MSA dated 12/19/2008

REINQUISHED BY / AFFILIATION

(Golder) 11/8/16 06:00

DATE

11/8/16

TIME

06:00

ACCEPTED BY / AFFILIATION

Golder 11/8/16 06:00

DATE

11/8/16

TIME

06:00

SAMPLE CONDITIONS

Temp in °C 4.7

Received on Ice (Y/N) Y

Custody Sealed Cooler (Y/N) Y

Samples Intact (Y/N) Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Scott D.ich

SIGNATURE of SAMPLER: [Signature]

DATE Signed (MM/DD/YY): 11/8/16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.